102D CONGRESS
1st Session
HOUSE OF REPRESENTATIVES
REPT. 102-259
Part 1

NATIONAL BIOLOGICAL DIVERSITY CONSERVATION AND ENVIRONMENTAL RESEARCH ACT

OCTOBER 21, 1991.—Ordered to be printed

Mr. BROWN, from the Committee on Science, Space, and Technology, submitted the following

REPORT

together with

ADDITIONAL AND DISSENTING VIEWS

[To accompany H.R. 585 which on January 18, 1991, was referred jointly to the Committee on Merchant Marine and Fisheries and the Committee on Science, Space, and Technology]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 585) to establish a national policy for the conservation of biological diversity; to support environmental research and training necessary for conservation and sustainable use of biotic natural resources, to establish mechanisms for carrying out the national policy and for coordinating related activities; and to facilitate the collection, synthesis, and dissemination of information necessary for these purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

CONTENTS

		Page
I.	Purpose of bill	6
II.	Committee actions	7
III.	Background and need for the legislation	7
IV.	Explanation of the bill	21
V.	Section-by-section analysis	27
VI.	Oversight findings and recommendations	29
VII.	Congressional Budget Act information	29
VIII.	Congressional Budget Office cost estimate	29
IX.	Effect of legislation on inflation	31
X.	Changes in existing law made by the bill, as reported	31
XI.	Committee recommendation	31
XII.	Additional and dissenting views	32

47-223

H703-9

The amendment is as follows:

Strike out all after the enacting clause and insert in lieu thereof the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Biological Diversity Conservation and Environmental Research Act."

SEC. 2. FINDINGS.

The Congress finds that—

(1) the Earth's biological diversity is being reduced at a rate without precedent in human history;

(2) most losses of biological diversity caused by human activity are unintended and largely avoidable;

(3) while the most rapid loss of biological diversity is occurring outside the United States, it is also a serious problem within this country;

(4) loss of biological diversity is occurring in nearly every habitat on earth, from tropical to polar, and from terrestrial to marine;

(5) reduced biological diversity may have serious consequences for human welfare as resources for research and agricultural, medicinal, and industrial development are irretrievably lost;

(6) reduced biological diversity may also endanger the functioning of ecosystems and critical ecosystem processes that moderate climate, govern nutrient cycles and soil conservation and production, control pests and diseases, and degrade wastes and pollutants;

(7) reduced biological diversity will diminish the raw materials available for scientific and technical advancement, including the development of improved varieties of cultivated plants and domesticated animals;

(8) existing information regarding the abundance and distribution of biological diversity is inadequate, often inaccessible, and frequently inapplicable to conservation management, thus hampering the efficiency of resource policy and management decisions;

(9) existing conservation laws focus on the protection of individual species that have already suffered declines, rather than emphasizing ecosystem management to sustain diversity across a range of species;

(10) existing laws and programs relevant to the loss of biological diversity in the United States are largely uncoordinated and inadequate, and sometimes result in duplication of efforts, conflicts in goals, and gaps in geographic and taxonomic coverage;

(11) a comprehensive and coordinated Federal strategy is needed to arrest the loss of biological diversity and also, where possible, to restore biological diversity both through natural recovery and active management;

(12) increased biological and ecological research is needed to provide the knowledge to maintain biological diversity, to protect and manage ecosystems, and to ensure the sustainable use of natural resources; and

(13) maintaining biological diversity through habitat preservation is often less costly and more effective than efforts to save species once they become endangered.

SEC. 3. DEFINITIONS.

For purposes of this Act—

(1) the term "biological diversity" means the full range of variability among living organisms and the natural communities in which they occur;

(2) the term "Center" means the National Center for Biological Diversity and Conservation Research establish under section 7;

(3) the term "Director" means the Director of the United States Fish and Wildlife Service;

(4) the term "inventories of biological diversity" means a program for the maintenance of a continually updated atlas and data base of the status, distribution, and trends of species and natural communities of the State in which the program is conducted, for the purpose of assisting in conservation planning, natural resource management, and environmental impact assessment, and such term includes State natural heritage programs and State biological surveys;

(5) the term "lands" refers to all areas, of either a terrestrial or aquatic nature, in which natural communities exist;

(6) the term "natural community" means a naturally occurring and interdependent assemblage of plants and animals, of either a terrestrial or aquatic nature;

(7) the term "Secretary" means the Secretary of the Interior;

(8) the term "species and natural communities of special concern" means species, of either a terrestrial or aquatic nature, whose populations are in decline from historical long-term levels but are not yet listed as threatened species or endangered species pursuant to the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), and types of natural communities characterized by significant loss or degradation across their range;

(9) the term "Strategy" means the coordinated Federal strategy for conservation of biological diversity prepared under section 5; and

(10) the term "viable population" means a population of a plant or animal species whose numbers and distribution are sufficient to ensure its long-term survival.

SEC. 4. POLICY AND PURPOSES.

(a) POLICY.—It is the policy of the United States that the conservation of biological diversity is a national goal.

(b) PURPOSES.—The purposes of this Act are—

(1) to identify methods to achieve the goal of conserving biological diversity;

(2) to authorize a national effort to collect, synthesize, and disseminate information about biological diversity; and

(3) to ensure the assessment of the impacts of major Federal actions on biological diversity in environmental documents prepared pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)).

SEC. 5. FEDERAL BIOLOGICAL DIVERSITY STRATEGY.

(a) PREPARATION OF STRATEGY.—The Council on Environmental Quality, in consultation with the appropriate Federal agencies, shall prepare a coordinated Federal strategy for the conservation of biological diversity.

(b) CONTENTS.—The Strategy shall, consistent with this Act and other laws of the United States—

(1) identify means of—

(A) maintaining viable populations of all native plants and animals that are well distributed throughout their geographic range, and that have sufficient genetic variability to maintain themselves; and

(B) maintaining representative examples of all types of natural communities that are native to the United States, including marine communities, that are sufficient in size and distribution to maintain viable populations of the native plants and animals that are associated with each type of natural community;

(2) identify the specific roles of various Federal agencies in attaining the objectives set forth in paragraph (1) (A) and (B); and

(3) establish guidance for Federal agencies to aid them in making their policies, actions, and programs consistent with the Strategy.

(c) PUBLIC PARTICIPATION.—The Council on Environmental Quality shall provide to the public opportunities to participate in the preparation of and to comment on the Strategy.

(d) SUBMISSION.—Within one year after the date of the enactment of this Act, the Chairman of the Council on Environmental Quality shall submit the Strategy to the President and the Congress.

SEC. 6. ENVIRONMENTAL REVIEW.

(a) BIOLOGICAL DIVERSITY IMPACT ASSESSMENT GUIDANCE.—

(1) IN GENERAL.—Not later than 18 months after the date of the enactment of this Act, the Council on Environmental Quality shall issue guidance to agencies regarding agency assessment of the impacts of major Federal actions on biological diversity in environmental documents prepared pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)).

(2) SPECIES AND NATURAL COMMUNITIES OF SPECIAL CONCERN.—The guidance issued under paragraph (1) shall include procedures for considering the impacts of agency actions on species and natural communities of special concern identified under section 8.

(b) AGENCY REVIEW PROCESS.—

(1) IDENTIFICATION OF AGENCIES AND DEPARTMENTS.—Not later than 3 months after the date of the enactment of this Act, the Council on Environmental Quality shall identify the Federal agencies that conduct programs that have a significant impact on biological diversity.

(2) AGENCY REVIEW.—Not later than 18 months after the date of the enactment of this Act, and every 2 years thereafter, each Federal agency identified by the Council on Environmental Quality under paragraph (1) shall—

(A) review its policies, actions, and programs for consistency with the Strategy; and

(B) report the results of that review to the Council on Environmental Quality.

(3) CEQ CONSISTENCY REVIEWS.—Not later than 2 years after the date of the enactment of this Act, and every 2 years thereafter, the Council on Environmental Quality shall—

(A) review the reports prepared under this section; and

(B) report to the Congress on the consistency of Federal programs with the Strategy.

SEC. 7. NATIONAL CENTER FOR BIOLOGICAL DIVERSITY AND CONSERVATION RESEARCH.

(a) ESTABLISHMENT.—There shall be established within the Smithsonian Institution, not later than 3 months after the date of the enactment of this Act, a center to be known as the National Center for Biological Diversity and Conservation Research.

(b) FUNCTIONS.—The Center shall—

(1) identify the most significant gaps in our understanding of biological diversity, including gaps in information regarding taxonomy, and ecology of and threats to species;

(2) develop a plan for filling those gaps in our understanding of biological diversity, and provide funds for projects designed to contribute toward implementation of that plan;

(3) provide information useful to the Council on Environmental Quality in the preparation of the Strategy;

(4) develop a plan for the establishment of a clearinghouse for information about biological diversity, including—

(A) an estimate of the cost of implementing the plan, and

(B) identification of persons who will be likely to use information provided through the clearinghouse;

(5) prepare, with the assistance of agencies and other sources, lists and, where appropriate, maps of——

(A) biotic communities, species, and populations that appear to be in significant decline or in imminent danger of loss of viability, or are otherwise of special concern;

(B) areas of outstanding ecological or biotic importance; and

(C) factors, including ownership status and applicable laws, affecting the protection of such communities, species, and populations; and

(6) publish information, such as floral and faunal treatises, resource inventories, vegetation maps, atlases, and guides for practical use of biological information, and especially publications that synthesize information relevant to national goals of understanding and conserving biological diversity.

(c) STRUCTURE AND MEMBERSHIP.—

(1) BOARD OF TRUSTEES.—There is established in the Smithsonian Institution a Board of Trustees to be known as the Trustees of the National Center for Biological Diversity and Conservation Research, which shall provide advice and assistance to the Board of Regents of the Smithsonian Institution on all matters relating to the policies, administration, and operation of the Center.

(2) MEMBERSHIP.—(A) The Board of Trustees shall consist of 14 members, including—

(i) one representative of the Fish and Wildlife Service;

(ii) one representative of the National Oceanic and Atmospheric Administration;

(iii) one representative of the National Science Foundation;

(iv) one representative of the Environmental Protection Agency;

(v) one representative of the Forest Service;

(vi) one representative of the National Park Service;

(vii) one representative of the Agricultural Research Service;

(viii) one representative of the Bureau of Land Management;

(ix) one representative of inventories of biological diversity;

(x) one representative of an organization described in section 9(a);

(xi) two scientists from nonprofit research institutions or universities; and

(xii) two representatives from institutions with collections of biological specimens.

(B) Members listed under clauses (ix) through (xii) of subparagraph (A) shall be appointed by the President from a list of nominees recommended by the National Academy of Sciences.

(3) TERMS.—Members of the Board of Trustees shall serve for terms of five years, and may serve more than one term.

(4) COMPENSATION OF MEMBERS.—

(A) NONGOVERNMENT MEMBERS.—Each member of the Board of Trustees that is not otherwise in the service of the Federal Government shall, to the extent provided for in advance in appropriations Acts, be paid actual travel expenses and per diem in lieu of subsistence expenses in accordance with section 5703 of title 5, United States Code, when such member is away from the member's usual place of residence.

(B) GOVERNMENT MEMBERS.—Each member of the Board of Trustees that is otherwise in the service of the Federal Government shall serve without compensation in addition to that received for such other service, but while engaged in the work of the Board of Trustees, such member shall, to the extent provided for in advance in appropriations Acts, be paid actual travel expenses, and per diem in lieu of subsistence expenses in accordance with subchapter I of chapter 57 of title 5, United States Code, when away from the member's usual place of residence.

(5) CHAIRMAN.—The members of the Board of Trustees shall select 1 member to serve as chairman.

(6) FUNDING ARRANGEMENTS.—The Director of the Center shall make appropriate arrangements for necessary administrative and clerical support of the Board of Trustees, in consultation with the chairman of the Board of Trustees.

SEC. 8. SPECIES AND NATURAL COMMUNITIES OF SPECIAL CONCERN.

(a) IDENTIFICATION.—The Director shall identify species and types of natural communities of special concern, in consultation with the Center and with persons and organizations referred to in section 9.

(b) NOTIFICATION OF FEDERAL AGENCIES.—The Director shall periodically notify Federal agencies of natural communities and species identified under subsection (a), for use by those agencies in making assessments described in section 6(a)(1).

SEC. 9. BIOLOGICAL DIVERSITY INVENTORY GRANTS.

(a) IN GENERAL.—The Secretary shall establish a program of grants—

(1) to persons and organizations conducting inventories of biological diversity, to enhance the ability of those programs to inventory and monitor data on the status, distribution, and trends of terrestrial and aquatic species and natural communities; and

(2) to other persons and organizations with experience and expertise in providing data on the status, distribution, and trends of terrestrial and aquatic species and natural communities, for use in land management decisions.

(b) FEDERAL SHARE.—Amounts provided in the form of a grant under this section may be used to pay not more than 75 percent of the cost of any activity carried out with the grant.

(c) AVAILABILITY OF DATA.—Data regarding a biological resource, that is collected or developed with a grant under this section shall be made available to the Federal Government upon request.

SEC. 10. CONSERVATION OF UNPROTECTED NATURAL COMMUNITIES.

(a) IN GENERAL.—The Secretary shall identify—

(1) the various types of natural communities that are native to the United States;

(2) each of the types of natural communities identified under paragraph (1) that does not occur in at least 3 protected areas of sufficient size to maintain viable populations of the native species of plants and animals associated with that type of community;

(3) the types of natural communities identified under paragraph (1) that are especially rich in terms of the number of native species they contain; and

(4) the locations on Federal lands of the types of natural communities identified under paragraph (2) or (3).

(b) NOTIFICATION OF AGENCIES.—Upon identifying the location of a natural community on Federal lands under subsection (a)(4), the Secretary shall—

(1) provide notice of that identification to the head of the Federal agency having authority over those lands; and

(2) advise the agency with respect to management actions that are necessary to—

(A) maintain viable populations of species of native plants and animals associated with the natural community that is the subject of that notification and

(B) ensure the long-term sustainability of that natural community.

(c) MINIMUM REQUIREMENTS FOR PROTECTED AREAS.—An area of lands may not be considered to be a protected area under this section unless the lands are—

(1) managed primarily for the purpose of maintaining viable populations of native plants and animals and self-sustaining natural communities; and

(2) subject to adequate, permanent land-use restrictions that ensure that viable populations of those plants, animals, and natural communities will be maintained in the future.

SEC. 11. AUTHORIZATION OF APPROPRIATIONS.

(a) BIOLOGICAL DIVERSITY INVENTORY.—For carrying out section 9, there are authorized to be appropriated to the Secretary $3,000,000 for fiscal year 1992, $3,000,000 for fiscal year 1993, and $3,000,000 for fiscal year 1994, to remain available until expended.

(b) CENTER.—For use for activities of the Center, there are authorized to be appropriated $10,000,000 for fiscal year 1992, $10,000,000 for fiscal year 1993, and $10,000,000 for fiscal year 1994, to remain available until expended.

(c) Amounts authorized under this section shall be derived from sums otherwise authorized to be appropriated.

I. PURPOSE OF THE BILL

H.R. 585 directly addresses the key issues associated with the conservation of biological diversity, including strengthening the national commitment to conservation and maintenance of biological resources, increasing the technical ability to assess and maintain biological diversity, and enhancing knowledge about biological resources.

To accomplish these goals, the Act makes conservation of biological diversity a national goal, directs that biological diversity be explicitly considered in Environmental Impact Statements, directs Federal agencies to review their programs for consistency with conservation of biological diversity, directs the Director of the U.S. Fish and Wildlife Service to identify species and natural communities of special concern, establishes a mechanism for a coordinated Federal Strategy for conserving biological diversity, establishes a program of grants to persons and organizations to do research on the status of biological diversity within the United States, and establishes a National Center for Biological Diversity and Conservation Research.

The National Center for Biological Diversity and Conservation Research is established in this Act to assess the status of the Nation's biological resources, including the gaps in the present level of information; to take steps to increase understanding of biological natural resources through inventory and monitoring; to provide information useful in the creation of the Federal Strategy; and to make this information usable for policy-makers. The Center is authorized to develop a coordinated network of biological databases and to plan, initiate, and provide financial support for an ongoing survey of the biota. In addition, the Center shall publish information in the form of maps, treatises, inventories, etc. on the status of national biological resources. The Center is to be established within

the Smithsonian Institution, with a Board of Trustees made up of public agencies and private organizations.

The bill calls for a coordinated effort to prevent further loss of biological diversity by gathering and using information in environmental management and planning.

At the present time, several states, including Michigan, Florida and Iowa, are considering state statutes containing biological diversity language similar to that found in H.R. 585.[1]

II. COMMITTEE ACTIONS

H.R. 585, the National Biological Diversity Conservation and Environmental Research Act, was introduced on January 18, 1991, by Representative James H. Scheuer, Chairman of the Subcommittee on Environment. The bill was subsequently referred to the Committee on Science, Space, and Technology and the Committee on Merchant Marine and Fisheries.

On May 23, 1991, the Subcommittee on Environment held a hearing on H.R. 585. Testimony was received from Administration and public witnesses. On June 18, 1991, the Subcommittee considered an amendment in the nature of a substitute to H.R. 585 and ordered it reported to the full Committee for further consideration. H.R. 585 was considered and ordered reported by the Committee on Science, Space, and Technology on July 30, 1991, with an amendment offered by Representative Robert S. Walker and two amendments offered by Representative Joseph Barton.

III. BACKGROUND AND NEED FOR THE LEGISLATION

A. Loss of Biological Diversity

Throughout the world, biological diversity is under assault.[2] The Scientific Advisory Board of the Environmental Protection Agency recently ranked the four greatest environmental problems facing the earth as habitat destruction, loss of biological diversity, stratospheric ozone depletion, and global climate change.[3]

---

[1] National Biological Diversity Conservation: Hearings on H.R. 585 and H.R. 2082 Before the Subcommittee on Environment of the House Committee on Science, Space, and Technology, 102nd Cong., 1st Sess. 141 (May 23, 1991) [hereinafter cited as "1991 Hearings"] (testimony of Laurie McDonald, Sierra Club).

[2] As used in the Act and in this report, the term "biological diversity" means the full range of variability among living organisms and the natural communities in which they live. The term includes genetic, species, and ecosystem diversity. Genetic diversity refers to the genetic material within and among populations of a species. Genetic interchange among species enables the development of desirable crop strains with increased drought tolerance or increased resistance to pests and diseases. See, e.g., Biological Diversity: Prospects and Problems: Hearings Before the Subcommittee on Natural Resources, Agriculture Research, and Environment of the House Committee on Science, Space, and Technology, 100th Cong., 1st Sess. 34 (May 28, Sept. 22, 1987) (No. 70) [hereinafter cited as "1987 Hearings"] (testimonies of Mark Plotkin, World Wildlife Fund; and Garrison Wilkes, University of Massachusetts). See also 1991 Hearings, supra note 1, at 48–63 (testimony of Michael Deland, Chairman, Council on Environmental Quality). Species diversity refers to the riches and variety of species at a particular location, while ecosystem or community diversity refers to the distinctive assemblages of species and ecological processes (such as food chains) that occur in different physical settings such as wetlands or tropical rainforests. All three levels of diversity—genetic, species, and ecosystem—are mutually dependent. See generally Office of Technology Assessment. 1987. "Technologies to Maintain Biological Diversity." OTA–F–330. U.S. Government Printing Office, Washington, D.C. [hereinafter cited as "OTA Report"].

[3] Scientific Advisory Board. September 1991. P. 13. "Setting Priorities and Strategies for Environmental Protection." SAB–EC–90–021. Environmental Protection Agency, Washington, D.C.

Scientists have estimated that at present rates, 10% of the earth's species may become extinct before the turn of the century, and more than 25% of all living species will be extinct "within the next couple of decades." [4] There is widespread scientific agreement that the present extinction rates are hundreds or even thousands of times higher than the background extinction rate of one species per year.[5] Scientists estimate that one plant or animal species worldwide is lost per day and that by the end of the decade, the extinction rate may rise to one species per hour.[6]

Indeed, the current rate of loss of biological diversity is approaching the rate of the Cretaceous Period some 65 million years ago, when the dinosaurs and about 50% of all other living species became extinct.[7] The extinction rate at that time is now generally agreed to have been caused by a catastrophic event, probably a comet or meteor collision with the earth.[8] What is unique about the present situation is the scale on which resource degradation is occurring and the absolute rate at which biological diversity is being reduced.[9]

According to a recent report released by the Environmental Protection Agency, two trends are associated with the most current and pressing environmental problems facing the earth.[10] These trends are exponential human population growth and increasing per capita consumption of resources. Almost 40% of net global primary production generated on land is now used to support only humans.[11] The six proximate causes of major human impacts to biological diversity are physical alteration of habitat (agriculture, urbanization, etc.), chemicals and waste products (sewage, petroleum spillage, etc.), global atmospheric change (greenhouse effect, loss of ozone layer, shifts in weather patterns, etc.), introduction of non-indigenous species (zebra mussel, gypsy moth, etc.), intentional and incidental taking of resources (hunting, fishing, logging, etc.), and synergistic effects (weather pattern shifts allowing a non-indigenous species to infiltrate a new habitat, etc.).[12]

1. Loss of Ecosystem Diversity

Much of the current loss of the earth's biological diversity is occurring in tropical rainforests, which contain more than 50% of the

---

[4] Raven, P.H. 1988. Our diminishing tropical forests. P. 121 in Wilson E.O. and F.M. Peter, eds. "Biodiversity." National Academy Press, Washington, D.C. [hereinafter cited as "Biodiversity"].

[5] Lovejoy, T.E. 1980. A projection of species extinctions. Pp. 328–331. Vol. 2 in Barney, G.O., study director, "The Global 2000 Report to the President, Entering the 21st Century." Council on Environmental Quality, Washington, D.C. [hereinafter cited as "Global 2000 Report"].

[6] U.S. General Accounting Office. 1989. P. 10. "Endangered Species: Management Improvements Could Enhance Recovery Program." GAO/RCED–89–5. Washington, D.C. [hereinafter cited as "GAO Report"].

[7] Erwin, T.L. Pp. 11–12 and Pp. 51–57 in Biodiversity, supra note 4.; Gore, Rick. June 1989. Pp. 664–690. Extinctions. In "National Georgraphic," Vol. 175(6), Washington, D.C.

[8] Kerr, Richard A. 1991. Pp. 160–162. Dinosaurs and friends snuffed out? In "Science," Vol. 251(4990), Washington D.C.

[9] 1987 Hearings, supra note 2, at 7 (testimony of Susan Shen, Office of Technology Assessment).

[10] Office of Policy, Planning and Evaluation. September 1990. Pp. 4–6. "Threats to Biological Diversity in the United States." PM–223/20P–1001. Environmental Protection Agency, Washington, D.C. [hereinafter cited as "OPPE Report"].

[11] Ehrlich P.R. and E.O. Wilson. August 16, 1991. Pp. 758–762. Biodiversity Studies: Science and Policy. In "Science," Vol. 253 (5021), Washington, D.C.

[12] OPPE Report, supra note 10, at Pp. 4–6.

world's plant and animal species in only about 7% of the world's land area.[13] The rate of tropical deforestation is conservatively estimated at 20 to 40 hectares per minute. Between 76,000 and 92,000 square kilometers (roughly 1% of the world's tropical forests) are eliminated completely every year, while an additional 100,000 square kilometers suffer significant disruption.[14] These losses have been well-publicized and are receiving increasing international attention.

A 90% reduction in habitat area has already occurred in several regions of the world. In these regions, the surviving biota struggles in islands of vegetation subject to various pressures including edge effects, human-induced disturbances, and inbreeding effects.[15] In these areas, local environmental disasters, including natural forces such as fires, can easily extinguish an entire species. Scientists argue that the destruction and/or disturbance of tropical rain forests will be accompanied by the extinction of a major proportion of all plant, animal and microbial species on earth—perhaps as much as 25%—during our lifetime.[16]

Experts believe that the disappearance of moist tropical forests contributes to changes in biological productivity, soil erosion and an increase in the accumulation of greenhouse gases which contribute to global warming phenomena. The eradication of these forests also contributes significantly to the total number of species lost worldwide. For example, it has been estimated that for every known species that is lost, tens of unknown species may be lost because of the complex relationships among ecosystems.[17]

In addition to the destruction of the tropical forests, severe losses in biological diversity are occurring throughout the world in other habitats such as old-growth forests, wetlands and coastal zones, deserts and rangelands.

The coastal zone, which comprises roughly 8 percent of the Earth's surface, includes coastal forests, marshes and watersheds. More than 50 percent of all humans live in the coastal zone and derive over 90 percent of their resources from it.[18] The coastal zone includes coastal bays and estuaries, which perform important ecological functions of denitrification and eutrophication. These regions also provide nursery areas for many marine species. Often overlooked are the sensitive tidal pool and coral reef ecosystems. Coral reefs are highly productive ecosystems that can successfully

---

[13] America's tropical rainforests are in Hawaii, Guam, American Samoa, Puerto Rico and the Virgin Islands. A prime example of tropical forest biodiversity, the Manu Biosphere Reserve in Peru contains more than 700 species of birds, a total which exceeds the number of species in all of North America. A single tree in the Tambopata Reserve in Peru houses 43 species of ants of 26 genera, an amount equal to the entire ant fauna of the British Isles. Similarly, in 100 selected 1-hectare plots in Borneo, 700 species of trees were identified, the same number found in all of North America. See Meyers, Norman. P. 28–35. Tropical Forests and Their Species. Going, Going . . . ? in Biodiversity, supra note 4.

[14] Food and Agriculture Organization and the United Nations Environmental Programme. 1982. "Tropical Forest Resources." United Nations, New York.

[15] Committee on International Science's Task Force on Global Biodiversity. 1989. P.5. "Loss of Biological Diversity: A Global Crisis Requiring International Solution." A report to the National Science Board, National Science Foundation, Washington, D.C. [hereinafter cited as "NSB Report"].

[16] Johnson, George B. and Peter H. Raven. 1989. P. 516. "Biology." Times Mirror/Mosby College Publishing Missouri. [hereinafter cited as "Biology"].

[17] GAO Report, supra note 6, at 10.

[18] Biodiversity, supra note 4, at 36–50.

concentrate nutrients from even the relatively nutrient-poor tropical waters, which constitute approximately 75% of the oceans' surface area.[19] Like the rain forests, coral reefs are among the most biologically diverse assemblages of organisms, and they are extremely vulnerable to human disturbances such as sewage effluents and siltation from terrestrial runoff.[20] The destruction and alteration of habitats by such influences is considered a major cause of coastal losses of biological diversity.

Marine biologists find that while the coastal regions of the ocean are in danger, the vast central reaches of the ocean are still healthy.[21] There is, however, a growing concern that all parts of the ocean are becoming imperiled.[22] For mid-oceanic environments, water pollution, marine debris, and overharvesting (both intentional and incidental) are the major causes of losses in biological diversity.[23]

While considerable attention has been focused on the loss of biological resources in the rainforests of the Amazon, it is important to note that biological resources within the United States are also threatened. The United States contains roughly 8% of the world's species and is losing biological diversity at rates that are proportionately similar to those in many parts of the developing world. In some cases, the rate of loss of biological diversity in this country greatly exceeds that of developing countries. For example, forests are lost at an annual rate of 1% in the state of Florida, roughly 2.5 times the rate in Brazil.[24]

In the United States, losses of biological diversity are typically the result of development activities such as the conversion of land for agriculture, housing, or commercial use; recreation; and mineral extraction. The most severe form of environmental disruption is the destruction of native habitats and fragmentation of ecosystems into isolated sections that can support only an impoverished fraction of their natural complement of species.[25]

More than 90% of the species native to Hawaii live nowhere else on Earth, yet many of these species have become extinct or are threatened with extinction. More than 70% of all recorded extinctions in the United States have occurred in Hawaii, and 25% of the

---

[19] Biology, supra note 16, at 509.

[20] Marine systems exhibit great biological variety and are being seriously degraded. See The National Biological Diversity Conservation and Environmental Research Act: Hearings on H.R. 4335 Before the Subcommittee on Natural Resources, Agriculture Research, and Environment of the House Committee on Science, Space, and Technology, 100th Cong., 2d Sess. 342 (June 9 and 30, 1988) (No. 143) [hereinafter cited as "1988 Hearings"] (testimony of The Oceanic Society)

[21] Knauss, John A. "The Health of the Ocean, or Boston Harbor is not the Sargasso Sea." Presented at "MIT Sea Grant Lecture." Massachusetts Institute of Technology, Cambridge, MA. October 25, 1990.

[22] Marine Biodiversity: Hearings Before the Subcommittees on Oceanography, Great Lakes and the Outer Continental Shelf; and Fisheries and Wildlife Conservation and the Environment of the House Committee on Merchant Marine and Fisheries, 102nd Cong., 1st Sess. (July 23, 1991) (testimony of Elliot Norse, Center for Marine Conservation).

[23] Thorne-Miller, Boyce and John Catena. 1991. Pp. 16–21. "The Living Ocean: Understanding and Protecting Marine Biodiversity." Island Press. Critical Issues Series: #4. Washington, D.C.

[24] Harris, Larry D. "The erosion of biological diversity and its mitigation: a Florida case example." Presented at "Meeting the Biodiversity Challenge: A Short Course for Decision Makers." Bureau of Land Managers Training Center, Phoenix, AZ. March 5–8, 1990.

[25] Global 2000 Report, supra note 5, at 44–45. According to the century-old theory of island biogeography, the number of species an area can support is related to the size of the area. This relationship is logarithmic, so the effect of habitat fragmentation is magnified. See also MacArthur, R.H. and E.O. Wilson. 1967. "The Theory of Island Biogeography," Princeton University Press, Princeton, New Jersey.

nation's endangered species are found there.[26] Subtropical forests in the Florida Keys and South Texas also contain sole habitats for some species. Forests in these areas have largely been leveled to gain land for agricultural purposes.[27]

The ancient temperate rainforests, found in a fairly narrow band from California to Southeast Alaska, are being reduced to fragments. In the Pacific Northwest, the clear-cutting of forests has increased siltation of freshwater ecosystems, thereby contributing to reductions in salmon runs.[28] The status of the northern spotted owl and the effects of habitat loss and fragmentation are currently in dispute among Federal agencies, the timber industry, and environmental groups.[29] The spotted owl is often referred to as an indicator species for biological diversity in old-growth forests of the Pacific Northwest.

> Whole communities, not just individual species, are at risk. The nation's most biologically diverse states—Hawaii, California, Texas and Florida, are all experiencing significant losses of natural communities. In Texas, nearly one-third of the inventories' plant and animal communities are at risk; in California the figure is one-fifth; in Florida, nearly half; and in Hawaii, over half.[30]

Additional threats to our nation's biological resources occur in wetlands. Among the country's most valuable natural resources, wetlands provide vital habitats for a variety of fish, shellfish, migratory birds, other animals, and plants. Millions of waterfowl and other economically valuable birds depend on these diverse wetlands as areas for breeding, feeding and migrating. About two-thirds of the major U.S. commercial fish, crustacean, and mollusk species use estuaries and salt marshes as the site of spawning and as a nursery habitat. Wetlands support most commercial and recreational fisheries in the U.S. Wetlands also perform essential ecological functions such as recharging aquifiers, filtering toxics from water supplies, processing organic wastes, assimilating floodwaters and protecting shorelines.[31]

As public awareness of the ecological, economic and recreational values of wetlands has grown, concern over remaining wetlands has increased. Although 35% of all rare and endangered species in the United States are either located in or are dependent on wetlands, this habitat represents only 5% of the nation's lands. Over the past two decades, an estimated 400,000 to 500,000 acres of wetlands have been annually filed in and converted to other uses,

---

[26] 1988 Hearings, supra note 20, at P. 9. (testimony of Hon. Daniel Akaka); See also The National Biological Diversity Conservation and Environmental Research Act: Hearings on H.R. 1268 Before the Subcommittee on Natural Resources, Agriculture Research, and Environment of the House Committee on Science, Space, and Technology, 101st Cong., 1st Sess. 265–267 (May 7, 1989) (No. 130) [hereinafter cited as "1989 Hearings"]. (Congressional Briefing on Hawaii's Biological Diversity—Appendix I.)

[27] OTA Report, supra note 2, at 73.

[28] NSB Report, supra note 15, at 5.

[29] Marble Mountain Audubon Soc. v. Rice, 914 F.2d 179 (9th Cir. 1990); See also 1988 Hearings, supra note 20, at 115 (testimony of James Pissot, National Audubon Society); See generally Reppetto, R. 1988. "The forest for the trees? Government policies and the misuse of forest resources." World Resources Institute, Washington, D.C.

[30] 1991 Hearings, supra note 1, at 54 (testimony of Michael Deland, Chairman, Council on Environmental Quality).

[31] OTA Report, supra note 2, at 41.

thereby eliminating wildlife habitats and a major source of the nation's water supply.[32] In California, for example, 91% of all wetlands have been lost since 1780.[33] In an effort to stem the loss of wetlands, legislation has been enacted to end Federal subsidies for the conversion of wetlands into farmland.[34]

The delicate desert and rangeland ecosystems of the West and Southwest also face threats to biological diversity. It is estimated that over 60 percent of our public rangeland is in unsatisfactory condition.[35] Threats arise primarily from the loss of distinct populations and parts of ecosystems, rather than from the extinction of entire species or ecosystems.[36]

While the impact of livestock grazing on biological communities in the West has received much attention, other threats to the biological integrity of the rangelands which deserve attention include diversion and pollution of water, mining, agricultural development, recreation, urban/suburban expansion and the development of transmission and transportation corridors. These activities all contribute to fragmentation of habitat, and the accumulated losses of populations and ecosystem fragments could soon result in the permanent disappearance of many species and communities.[37] The desert bighorn sheep, for example, is already threatened with the decimation of local populations and perhaps eventual extinction due to habitat fragmentation.[38]

2. Loss of Species Diversity

Species are the building blocks of ecosystems and are often the most obvious indicators of an ecosystem's health.[39] Since European colonization of North America, more than 500 species and subspecies have become extinct, and currently more than 1,000 species and subspecies (half of which live in the U.S.) are considered to be endangered or threatened.[40] According to the testimony of the U.S. Fish and Wildlife Service, although approximately 1,000 candidate species have met the requirements for classification as endangered or threatened species, only 50–60 species are actually added to the list each year.[41] In addition, approximately 4,000 species have been

---

[32] Conservation Foundation. 1988. P.12 "Protecting America's wetlands: An action agenda." The final report of the National Wetland Policy Forum. The Conservation Foundation, Washington, D.C.

[33] Dahl, T.E. 1990. P.5. "Wetlands Losses in the United States 1780's to 1980's." U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.

[34] P.L. 99-198 Title XII.

[35] 1988 Hearings, supra note 20, at 113 (testimony of James Pissot, National Audubon Society).

[36] Cooperrider, A. 1990. P.1. "Conservation of Biological Diversity on Western Rangelands," U.S. Bureau of Land Management, Washington, D.C. [hereinafter cited as "Rangelands"].

[37] Rangelands, supra note 36, at 6.; See also Ehrlich, P.R. 1987. Pp. 12–15. Habitats in Crisis. In "Wilderness," 50(176), Washington, D.C.

[38] Cooperrider, A. 1985. The desert bighorn. Pp. 472–485. In DiSilvestro, R. ed., "Audubon Wildlife Report," The National Audubon Society, New York, New York.

[39] McNeely, Jeffrey A., Kenton R. Miller, Walter V. Reid, Russell A. Mittemeier and Timothy B. Werner. 1990. P.56. "Conserving the World's Biological Diversity." International Union for the Conservation of Nature, Gland, Switzerland; World Resources Institute, Conservation International, World Wildlife Fund, and the World Bank, Washington, D.C.

[40] See generally U.S. Fish and Wildlife Service. 1989. "Endangered and Threatened Plants and Animals." Department of the Interior, Washington, D.C.

[41] 1988 Hearings, supra note 20, at 251 (testimony of John Buffington, U.S. Fish and Wildlife Service).

proposed for endangered or threatened listings and are currently awaiting review.[42] The Nature Conservancy estimates that nearly 9,000 species of plants and animals may be at risk of extinction in the United States.[43] A recent study by the Center for Plant Conservation states that some 12–20% of all plant species in the U.S. are at risk of extinction, with as many as 700 extinctions expected to occur in this decade.[44] The diversity of butterfly species in one county in Ohio, for example, has already declined from 64 to 42 species in the last 25 years. According to Dr. Thomas E. Lovejoy, Assistant Secretary for External Affairs of the Smithsonian Institution, this situation is typical of what is happening to species diversity throughout the country.[45]

3. Loss of Genetic Diversity

Species extinction is the final point in the continuum of the loss of biological diversity. Reductions in genetic diversity within individual species, the extirpation of distinct populations of plants and animals, and the devastation of native plant and animal communities and ecosystems are occurring in all habitats and in most geographic regions.

B. Implications of the Loss of Biological Diversity

Human dependence on animal and plant resources has not abated despite the chemical revolution of the last 50 years.[46] Biological resources still provide the raw materials for food, most pharmaceuticals, clothing, and shelter. The loss of species and genetic diversity unquestionably diminishes the pool of biological resources available for human use. Since extinctions are irreversible, the present losses of diversity will result in future generations inheriting a biologically impoverished world, with potentially significant social, health and economic consequences.[47]

Nowhere is this fact more evident than in the area of agriculture.[48] Genetic resources are of critical importance for continued improvement of agricultural crops. Indeed, improved breeds of crops derived from a diverse gene pool of wild plants have accounted for about half of the increase in productivity in American agriculture and annually contribute about $1 billion to U.S. agriculture.[49] The Department of Agriculture has long recognized agricul-

---

[42] 1991 Hearings, supra note 1, at (testimony of Michael Deland, Chairman, Council on Environmental Quality).

[43] Ibid.

[44] 1989 Hearings, supra note 26, at 13–21 (testimony of Donald Falk, Center for Plant Conservation).

[45] 1988 Hearings, supra note 20, at 220 (testimony of Thomas Lovejoy, Smithsonian Institution).

[46] The Global Food and Population Equation: A Fragile Balance. A report prepared by the Subcommittee on Natural Resources, Agriculture Research and Environment of the Committee on Science, Space, and Technology, U.S. House of Representatives, 101st Cong., 1st Sess. (August 1989)(Serial F). See also World Commission on Environmental Development, 1987. Our Common Future. Oxford University Press, New York.

[47] 1987 Hearings, supra note 2, at 30–71 (testimony of Mark Plotkin, World Wildlife Fund, and Garrison Wilkes, University of Massachusetts).

[48] For a discussion of declining crop diversity, See Linden, Eugene. August 19, 1991. Pp. 48–50. Will we run low on food? In "Time," Vol. 138 (7) N.Y., N.Y.

[49] OTA Report, supra note 2, at 4. Genetic engineers have cloned a gene from tropical tomatoes which has increased the density of domestic tomatoes by 2% and will generate higher profits for catsup manufacturers. Scientists have also isolated a protein from wild Mexican beans

Continued

ture's vested interest in the conservation of important plant, microorganism and animal germplasm, since economically important crops are likely to be developed from genetic material derived from plants and animals which possess unique and desirable traits.[50]

Narrowing of the genetic base due to loss of native plants poses risks to crops.[51] Agricultural scientists have learned in recent years that highly-bred monocultures are frequently prone to devastation from diseases and pests. In 1970, over 10% of the U.S. corn crop was destroyed by a fungal blight because farmers had planted the same highly-bred corn variety which was genetically susceptible to the blight. The importation of a disease-resistant strain of corn from Mexico and the development of new strains of corn using material derived from the resistant strain prevented total disaster, but if genetic diversity continues to decline, such rescues may not be possible in the future.

In the medical field, plant and animal species remain an important source of pharmaceutical ingredients. Higher plants are the source of over 121 clinically useful prescription drugs, as well as innumerable forms of traditional medication for peoples around the world.[52] Plant extracts are used in about 25% of the prescription drugs used in the United States, with a market value totalling $15 billion annually.[53]

It is estimated that at present less than 5 percent of the species on earth have been tested for either food or pharmaceutical potential, with less than one percent tested for use in other products.[54] According to the testimony of the American Pharmaceutical Association:

> It is alarming to consider that years ago, there might have existed a plant or microorganism that could have cured AIDS or other diseases, but that through inaction, that species became extinct.[55]

Although several important pharmaceutical discoveries have come from the tropical rainforests, some have come from other regions. The Pacific yew tree (*Taxus brevifolia*), found in the temperate forests of the Pacific Northwest, has recently become the center

---

that repels insects and may have potential as an agricultural pesticide which will not decrease soil and water quality. Future newspapers may be printed on paper from kenaf, an African plant which can produce five times more pulp an acre than the trees normally cut for newsprint.

[50] 1988 Hearings, supra note 20, at 326–327 (testimony of Henry Shands, Agricultural Research Service). The Agricultural Research Service coordinates numerous activities involved with the conservation of biological diversity, including maintaining plant germplasm of agriculturally important crops, industrially important microbes, and economically important animal germplasm.

[51] 1987 Hearings, supra note 2, at 59 (testimony of Garrison Wilkes, University of Massachusetts.).

[52] Abelson, P.H. 1990. P. 513. Medicine from Plants. In "Science," Vol. 247 (4942), Washington, D.C. See also 1987 Hearings, supra note 2, at 42 (testimony of Mark Plotkin, World Wildlife Fund); International Consultation on Conservation of Medicinal Plants. "Chiang Mai Declaration." WHO/IUCN/WWF, Chiang Mai, Thailand. March 26, 1986.

[53] Plants and animals are essential for development in a variety of medicines. Vincristine and vinblastine, potent drugs used in the treatment of leukemia and Hodgkin's disease, were derived from the rosy periwinkle found in Madagascar. The venom of the Brazilian pit viper is the basis of a drug marketed for control of high blood pressure.

[54] 1991 Hearing, supra note 1, at 98 (testimony of James McChesney, Institute of Pharmaceutical Sciences).

[55] 1988 Hearing, supra note 20, at 351 (testimony of the American Pharmaceutical Association).

of controversy concerning sustainable yield. The bark and needles of the Pacific Yew contain a potent compound which is active against ovarian and breast cancer.[56] Within the years since the drug's discovery, fears have arisen that the species might be harvested to extinction, while methods may exist to harvest the material on a sustainable yield basis.[57] At the same time, pressure is building to increase the production of this drug since shortages are impeding the progress of clinical trails.[58] In addition to the new drugs derived from terrestrial plants and animals, potential pharmaceuticals are also being developed from various marine plants and animals.[59]

Ensuring a wide genetic base is fundamental to maximizing the utility of biotechnology in agriculture and medicine.[60] The loss of germplasm is of considerable concern, since exploitation of genetic variability underlies most biotechnology developments. The selective pressures caused by pollution, climate changes and other habitat alterations have been associated with decreases in variabilities among populations.

In addition to its economic value as a source of important products, the diversity of biological resources also performs key environmental functions. Genetic diversity and species diversity are necessary components of a healthy, functioning ecosystem. Soil productivity, for example, depends on nutrient cycling, which itself is a function of a complex interrelationship among microorganisms, plants and animals. The degradation of wastes (both natural and man-made) depends upon ecological processes involving microorganisms, plants, and animals. Biological resources play a major role in moderating the earth's physical environment; tropical forests, for example, store carbon and thus reduce the atmospheric concentration of carbon dioxide.[61] The loss of diversity at all levels disrupts ecological processes and can lead to environmental degradation ranging from soil erosion and the loss of soil productivity to climate change.

Recreational utilization of natural resources is also of significant economic importance. In 1985, Americans spent $820 million on fishing and hunting licenses, stamps, tags and permits; $21.6 billion on hunting and fishing equipment; and $17.0 billion on food, lodg-

---

[56] In January, 1991, the National Cancer Institute signed a Cooperative Research and Development Agreement (CRADA) with Bristol-Myers Squibb to co-develop this drug.

[57] Exclusive agreements between Federal Agencies and Bristol-Myers Squibb Co. for Drug Development: Is the Public Interest Protected: Hearings Before the Subcommittee on Regulation, Business Opportunities and Energy of the House Committee on Small Business, 102nd Cong., 1st Sess., (July 29, 1991) (testimony of Jerry Rust, Native Yew Conservation Committee).

[58] Borman, Stu. 1991. Pp. 11–18. Scientists mobilize to increase supply of anticancer drug Taxol. In "Chemical and Engineering News," Vol. 69 (35), Washington, D.C.

[59] A large variety of marine taxa are being used to develop pharmaceuticals, including algae for anti-viral drugs; algae, corals, sea anemones, sponges and mollusks for antibiotics; porcupine and puffer fish for symptomatic treatments of terminal cancer; sea cucumbers, sea snake, menhaden and stingrays for cardiovascular drugs; algae and octopus for anti-hypertension drugs; and sharks for anti-cancer derivatives. (Thor-Miller, Boyce and John Catena. 1991. Pp. 16–21. "The Living Ocean: Understanding and Protecting Marine Biodiversity." Island Press. Critical Issues Series: #4. Washington, D.C.)

[60] 1987 Hearings, supra note 2, at 53–71 (testimony of Garrison Wilkes, University of Massachusetts). See also Plotkin, M. The outlook for new agricultural and industrial products from the tropics. Pp. 106–116. in Biodiversity, supra note 4.

[61] See generally Technologies for Remediating Global Warming: Hearings Before the Subcommittee on Natural Resources, Agriculture Research and Environment and the Subcommittee on Science, Research and Technology of the House Committee on Science, Space, and Technology, 100th Cong., 2nd Sess. (June 29, 1988) (No. 137).

ing and transportation for hunting and fishing trips.[62] The Federal government spends more than $250 million a year to support the conservation of sport fish and game animals. This expenditure has helped make the conservation of game and sport fish generally more successful than the overall conservation of biological diversity.[63]

Although it is difficult to quantify the non-economic values of biological diversity, it is clear that Americans place a significant aesthetic and moral value on their natural resources, regardless of the resources' economic worth. Concern for conservation of both plant and animal species has long been enshrined in American law and custom. Americans pay $50 million annually in admission fees for National Parks to view diversity manifested in the giant redwood forests and the herds of native animals.[64]

C. Failure of Present Laws to Prevent the Loss of Biological Diversity

"In spite of numerous positive federal, state and private efforts underway, present efforts to conserve biological diversity are not completely adequate." [65] Although some 29 federal laws are supposed to protect biological resources in the United States, the number and rate of extinctions of plant and animal species are growing, and ecosystems including wetlands, forests and rangelands are being disrupted and impoverished.

Current laws and policies addressing the loss of biological diversity in the United States are largely piecemeal and uncoordinated.[66] Although many Federal laws affect conservation of biological diversity, few refer to it specifically. The National Forest Management Act of 1976 (P.L. 94–588) is the only statute which includes in its mandate the onsite conservation of a "diversity of plant and animal communities." However, the implementation of this bill has been hampered by the lack of Congressional direction concerning the meaning and scope of this charge.

Existing Federal programs focus on preserving individual elements of diversity such as specific ecosystems, species, or gene pools, or on protecting endangered wildlife without an integrated approach towards conservation or maintenance of biological resources in general. Species protection laws authorize the Federal agencies to maintain specific animal populations.[67] Habitat protec-

---

[62] U.S. Fish and Wildlife Service, November, 1988. "1985 National Survey of Fishing, Hunting and Wildlife Associated Recreation." U.S. Department of the Interior, Washington, D.C.

[63] 1991 Hearing, supra note 1, at 153 (testimony of Michael Bean, Environmental Defense Fund).

[64] 1987 Hearing, supra note 2, at 76 (testimony of Bryon Norton, University of South Florida).

[65] The Keystone Center. 1991. P. 1. "Final Consensus report of the Keystone Policy Dialogue on Biological Diversity on Federal Lands." Keystone, Colorado. [hereinafter cited as "Keystone Dialogue"]—"Beginning in the spring of 1989, about sixty individuals from a diverse cross-section of groups and organizations concerned about the conservation of biological diversity on the nation's federal lands came together to form consensus recommendations. Their efforts focused on the biological diversity programs of the major federal land management agencies (Bureau of Land Management, Department of Defense, Fish and Wildlife Service, USDA Forest Service, and National Park Service). Among the Dialogue participants were individuals from federal agencies, Congressional committee staff's, environmental organizations, commodity groups, professional associations, and academia."

[66] OTA Report, supra note 2, at 11–15.

[67] For examples, see Migratory Bird Conservation Act of 1929, 16 U.S.C. 715 et seq.; Bald Eagle Protection Act of 1940, 16 U.S.C. 668 et seq.; Marine Mammal Protection Act of 1972, 16 U.S.C. 1361 et seq.; and Endangered Species Act of 1973, 7 U.S.C. 136, et seq.

tion laws authorize the acquisition or designation of habitats under Federal stewardship.[68] Federal laws for offsite maintenance of plants authorize the collection and genetic development of selected plant species that demonstrate potential economic value.[69] There is, however, no legal or administrative framework that integrates these disparate laws and programs. In 1984, Dr. M. Rupert Cutler, then President of Defenders of Wildlife, stated:

> In statutes already on the books, the Congress has urged agencies to consider biological diversity and even "required" its consideration in planning and programs.
>
> Too often, however, we have seen a lack of accountability in terms of deadlines, standards and even effective third-party enforcement mechanisms. Their absence has turned these so-called policy statements by the Congress into relatively impotent pleas that are ignored by the agencies with impunity.
>
> For example, section 5(a) of the Endangered Species Act requires the Secretary of the Interior and the Secretary of Agriculture to develop and implement a conservation plan for wildlife, fish and plants, including but not limited to endangered and threatened species. But if that has been done, we are not aware of it.[70]

State-level efforts at biological diversity conservation constitute a similar patchwork of laws and programs. All states have programs to protect their wildlife resources, and all states and several Indian Nations have natural heritage programs to identify and protect rare biological elements. Even these programs fail to address the loss of biological diversity in a coordinated way.[71]

> If present trends continue and our focus remains on the most critically endangered species, we will fight battle after battle to save individual species, winning very few of them, and additional species will decline to the point where they are endangered. It is a sad commentary that the current widespread practice of "Emergency Room Conservation" channels most of the economic and emotional support for the protection of biological diversity into the few species that are least likely to benefit from it . . . We need to act now to develop a strategy to insure that the greatest number of species possible will survive.[72]

According to the General Accounting Office, the Fish and Wildlife Service has been concentrating its Endangered Species Recovery Fund on highly visible species "and those approaching recovery." [73] Reliance on the endangered species approach to the man-

---

[68] Fish and Wildlife Coordination Act of 1934, 16 U.S.C. 694; Fish and Wildlife Act of 1956, 15 U.S.C. 713 et seq.; 16 U.S.C. 742 et seq.; and Wild and Scenic Rivers Act of 1968, 16 U.S.C. 1271-1287.

[69] Agricultural Marketing Act of 1946, 5 U.S.C. 5315 etc.; Forest and Rangeland Renewable Resources Act of 1978, 16 U.S.C. 1641-1647.

[70] 1989 Hearings, supra note 26, at 92 (testimony of Rupert Cutler, Defenders of Wildlife).

[71] OTA Report, supra note 2, at 230-232. See also 1987 Hearings, supra note 2, at 185 (testimony of Kenton Miller, International Union for Conservation of Nature and Natural Resources); 1988 Hearings, supra note 20, at 114 (testimony of James Pissot, National Audubon Society).

[72] 1988 Hearings supra note 20, at 297-302 (testimony of Michael Scott, University of Idaho).

[73] GAO Report, supra note 6, at 3.

agement of biological resources is of dubious value, since according to the GAO, nearly half of the tasks set out in a sample of 16 recovery plans had not been undertaken, even though the plans had been approved on average for over 4 years.[74] The Council on Environmental Quality recently reported that "a vigorous response to the decline of individual species—based on the Endangered Species Act—remains essential, but the nation also needs new strategies to protect natural communities and biodiversity." [75] Endangered species prevention through ecosystem protection is likely to be much more effective than endangered species recovery.[76]

Although Congress mandated that the Fish and Wildlife Service establish a priority system to guide the expenditure of funds on endangered species, the Agency's efforts have not been concentrated on the most endangered species and on actions to prevent extinctions in the near term.

According to the General Accounting Office, Federal agencies face a difficult challenge in establishing a balance between competing demands on resources. Current legislation is insufficient with regard to detailing the management practices necessary to manage a resource for multiple-use and sustained-yield operations. The GAO found that the Forest Service's and Bureau of Land management's budget and staffing profiles often reflected the demand to meet grazing, logging and mining interests first, and then to meet wildlife needs as circumstances permitted.[77]

Federal agency representatives have repeatedly asserted that the existing statutory authority is sufficient to address the problem and that no new authority is needed. All agree, however, that biological diversity continues to decline. Based on testimony before the Committee, it appears that problems must exist with the existing statutory mandates: either they are inadequate, they are ineffectually utilized, or they are being dramatically underfunded. It is possible that the problem results from a combination of all of these.[78]

1. Lack of an Ecosystem Approach

Conservation of biological resources depends upon maintenance of the full abundance and distribution of each species throughout its natural geographic range. Species survival depends on the survival of all the distinct biological populations of the species.[79] This concept of species survival is consistent with the definition used in the Endangered Species Act, which is that a species is a distinct

---

[74] Ibid.

[75] Council on Environmental Quality. April 1991. P. 141. "Twenty-First Annual Report." Washington, D.C.

[76] 1988 Hearing, supra note 20, at 114 (testimony of James Pissot, National Audubon Society).

[77] U.S. General Accounting Office. 1991. Pp. 2-5. "Public Land Management: Attention to Wildlife is Limited." GAO/RCED-91-64. Washington, D.C.; Recognizing this problem, some legislators have begun to propose incorporation of language into land management legislation that would seek to maintain and restore, where feasible, natural biological diversity. See 137 Cong. Rec. 5708 (1991).

[78] 1991 Hearings, supra note 1, at 150 (testimony of Michael Bean, Environmental Defense Fund).

[79] For example, bald eagles live in much of the United States from Alaska to Florida. Conserving them means not only protecting eagles in Alaska, where they are common, but also in Florida, where they are threatened.

population, and with the concept of species as collections of potentially interbreeding populations.[80]

It is impossible to manage Federal lands for each individual species and population. However, if habitats are preserved, the populations that live within a specific habitat will generally survive. Habitat preservation will be effective only if each habitat is viewed and managed in the context of the larger ecosystem of which it is a part.[81] It is essential to manage ecosystems on a regional scale in order to provide for the long-term survival of species and natural communities.[82] The ecosystem management concept has been strongly endorsed by scientists involved in land management and recommended to the National Park Service as a means to maintain the ecological integrity of the national parks.[83] No single unit of Federal land is a complete ecosystem large enough to provide complete habitat for all of its species. Unless Federal land is managed in a coordinated way as ecosystems, no individual agency will be able to protect the biological diversity within its jurisdiction.[84]

2. Lack of Coordination on an Ecosystem Basis

Despite the fact that land use decisions by one Federal agency have an impact on the biological diversity of areas under the jurisdiction of other agencies, there is little shared management or formal coordination among the various Federal land-managing agencies.[85] Although there are indeed areas which have been managed successfully on an ecosystem level by various Federal agencies such as the Greater Yellowstone ecosystem and the Southern Appalachian region, most Federal land management is not performed in a cooperative and comprehensive manner.[86] Even in the case of the Yellowstone ecosystem, the Bureau of Land Management and the Fish and Wildlife Service are not included in the coordinating agreement, despite their management of land within the ecosystem.[87]

The Man and the Biosphere program, a multi-agency program which seeks to balance the human role in the environment against the sustainable use of resources, is a good model for interagency cooperation in the preservation of biological diversity.[88]

---

[80] 16 U.S.C. 1532.

[81] See generally Agee, J. and Johnson, D. 1988. "Ecosystem management for parks and wilderness." University of Washington Press, Seattle, Washington.

[82] See generally National Research Council, Commission on Life Sciences, Committee on Applications of Ecological Theory to Environmental Problems. 1986. "Ecological Knowledge and Environmental Problem-Solving: Concepts and Case Studies," National Academy Press, Washington, D.C.

[83] See generally National Parks and Conservation Association, C. John Gorden, Chairman. 1989. "National Parks: From Vignettes to a Global View, A report from the Commission on Research and Resource Management Policy in the National Park System." Washington, D.C.

[84] 1987 Hearing, supra note 2, at 248 (testimony of Dale Robertson, Chief, U.S. Forest Service).

[85] 1988 Hearing, supra note 20, at 57 (testimony of Dale Robertson, Chief, U.S. Forest Service).

[86] 1987 Hearing, supra note 2, at 187-189 (testimony of William Mott, Director, National Park Service); See also 1988 Hearing, supra note 20, 30-36 (testimony of Dale Robertson, Chief, U.S. Forest Service).

[87] 1988 Hearings, supra note 20, at 190 (testimony of Barry Flamm, Wilderness Society).

[88] 1987 Hearings, supra note 2, at 107-109 (testimony of William Gregg, National Park Service).

3. Lack of Scientific Information

Efforts to conserve biological diversity are severely hampered by a lack of fundamental knowledge. Recognizing that scientists have identified only 1.4 million species, only a small fraction of the earth's biota, the Ecological Society of America has called for "a framework for the acquisition, dissemination, and utilization of ecological knowledge which supports efforts to ensure the sustainability of the biosphere." [89]

The United States does not have a functioning national biological survey, national biological database, or a national network of biological databases. Without these informational resources, it is difficult for scientists and resource managers to delineate priority areas and habitats under the greatest threat and to develop productive and cost-effective approaches to preserve these resources.

Recently, much attention has been focused on other countries that have created national inventories of biological diversity. Costa Rica is in the process of initiating "a national 10-year total inventory of the 500,000 species of organisms estimated to be in the country, and which represent nearly 4–5 percent of the world's biological diversity." [90] Other countries with national inventories of biological diversity include Canada and Australia.[91]

Much information in the U.S. is already available, but not in an assimilated form useful to decision makers. Data on the status and trends of biological diversity are scattered among Federal, State, and foreign agencies and private organizations. Consolidation of these data is necessary to identify knowledge gaps, to provide a comprehensive understanding of the status of the Earth's biota, and especially to define priorities for action.[92]

As Dr. Peter Raven, Director of the Missouri Botanical Gardens and past president of the American Institute of Biological Sciences observed, it is necessary to move beyond recombining existing data to collect the new information needed to understand and conserve biological diversity.

> Our information isn't complete and no amount of re-digesting the literature will make it complete or really provide an adequate data base on which to operate.[93]

Without a comprehensive species inventory and additional research in the areas of conservation biology and restoration ecology, efforts to preserve biological resources will be hampered.

> Current technologies are insufficient to prevent further erosion of biological resources. Thus increasing the nation's ability to maintain diversity will require acceleration of basic research as well as research in development

---

[89] Lubchenco, J. et al. 1991. Pp. 371–412. The Sustainable Biosphere Initiative: An Ecological Research Agenda. In "Ecology," Vol. 72(2), Arizona State University, Tempe, AZ.

[90] Gamez, Rodrigo. 1991. P. 79–80. Costa Rica's National Biodiversity Institute: Biodiversity Working Sustainably for Society. In "Diversity," Vol. 7 (1 and 2), Washington, D.C.

[91] Hoagland, K.E. 1991. P. 45–50. Workshop on Biodiversity and Collections Held. In "Association of Systematics Collections Newsletter," Vol. 19 (4), Washington, D.C.

[92] OTA Report, supra note 2, at 20.

[93] 1988 Hearings, supra note 20, at 235 (testimony of Peter Raven, Director, Missouri Botanical Garden).

and implementation of resource management technologies.[94]

Research that contributes to biodiversity conservation has traditionally been divided between basic research supported by the National Science Foundation and applied studies supported by agencies such as the Fish and Wildlife Service and Forest Service. No Federal agency supports research that integrates basic and applied sciences for conservation and conservation technologies. The National Science Foundation has developed a research plan for biological diversity which has as its centerpiece the concept of multi-agency support for research in conservation biology.[95]

America's long tradition of developing natural resources has contributed much to our material success in many areas of commerce. Now, however, we face a fragmented landscape upon which we are trying in vain to recreate habitats for endangered species.[96]

It is no longer feasible to protect our natural resources simply through a reserve system. Many scientists now believe that "by almost any quantitative standard conservation is failing, and that current approaches to conservation, such as traditional parks and reserves are unlikely to succeed. Worldwide, only about 3% of the land is set aside in 5000 nature reserves or protected areas, but many of these reserves are deteriorating."[97] The multiple and often-times competing demands facing this nation require that we manage our natural resources in a multi-use, sustainable manner. While the loss of biological resources may sometimes be unavoidable, such loss must be faced squarely by land-use planners and policy-makers and not be relegated to the level of an unintended consequence of development. The changes necessary to achieve biological diversity goals and objectives can be accomplished, however, while allowing significant human use of natural resources on federal lands.[98]

IV. EXPLANATION OF THE BILL

A. Conservation and Maintenance of Biological Diversity

The goal of this Act is to establish mechanisms for research, planning and coordination necessary to maintain fully functioning ecosystems and native species on federal lands and waters. It is the intent of this Act that measures be taken to ensure the continued existence of populations and ecological communities and to support, where practical, efforts to restore lost diversity through natural recovery and active management that may lead to increased viability of populations.

B. National Environmental Policy Act of 1969

The National Environmental Policy Act (NEPA) is a comprehensive environmental statute which states the Federal government's responsibility to "preserve important historic, cultural, and natural

---

[94] OTA Report, supra note 2, at 15.
[95] NSB Report, supra note 15, at 12.
[96] See generally GAO Report, supra note 6.
[97] Soule', Michael E. August 16, 1991. Pp. 744–750. Conservation: Tactics for a Constant Crisis. In "Science," Vol. 253 (5021), Washington, D.C.
[98] Keystone Dialogue, supra note 65, at 1.

aspects of our natural heritage, and maintain, wherever possible, an environment which supports *diversity* and individual choice" (emphasis added).[99] Under NEPA, Federal agencies are required to consider the environmental implications of a proposed action and prepare a detailed statement of the impact of the action on the environment. This statute was not intended to preempt the decision-making authority of public officials and does not itself prevent actions from being undertaken. It is largely a procedural and planning statute.

Although Environmental Impact Statements must note any impacts on species already listed as threatened or endangered,[100] they have not generally extended consideration to broader issues affecting biological diversity such as habitat fragmentation, which is a root cause of the loss of biological diversity. This observation was underscored by the testimony of representatives of Federal agencies who stated that while certain aspects of biological diversity are presently addressed in Environmental Impact Statements, biological diversity *per se* is not required to be considered. According to Dr. Peter Raven, "(environmental) impact statements are often of little use unless challenged, because the information contained in them is not viewed in any larger context." [101]

This bill requires that the Council on Environmental Quality (CEQ) develop guidelines for the consideration of biological diversity in Environmental Impact Statements required to be filed pursuant to NEPA. These guidelines will serve as a checklist for evaluating the possible environmental outcomes of an action. Information gathered under these instructions will result in the identification of biotic communities, species, and populations that are of special concern, including, for example, those that are in decline or in imminent danger of loss of viability.

In order to evaluate the status of biological diversity in a particular area, species must be identified and ecological process must be qualitatively described. Although the prime focus of an Environmental Impact Statement is the area directly impacted by the proposed action, consideration of impacts on biological diversity must also include any effects arising form cumulative impacts such as regional losses of populations and habitats.

An evaluation of the impact of an action on biological diversity should include consideration of the range of factors that have been associated with reductions in biological diversity, including habitat destruction or fragmentation, pollution, and the introduction of exotic species as well as the direct loss of biological populations. Specific attention should be given to plant and animal communities, species and populations which are of special concern.

C. Policy Statement

Although the United States has developed a policy regarding the conservation of biological diversity in its international activities

---

[99] 42 U.S.C. 4321-4347 Sec. 101(b)(4).

[100] The Endangered Species Act of 1973 (P.L. 93-205); "Endangered" species are those determined to be currently in danger of extinction; "Threatened" species are those not currently in such danger but likely to become so within the foreseeable future.

[101] 1991 Hearings, supra note 1, at 37 (testimony of Peter Raven, Director, Missouri Botanical Garden).

and in 1989 spent over $23 million to fund biological diversity and conservation research in developing countries, there is no cohesive policy for preservation and maintenance of domestic biological resources.[102]

Much of the world looks to the United States for environmental leadership. In June, 1992, the United Nations Conference on Environment and Development (UNCED) will convene in Brazil to consider, among other matters, the issue of declining biological resources, including loss of biological diversity and the loss of forests. H.R. 585, by specifically stating that the conservation of biological diversity is a national goal, affirms the United States' interest in these issues.[103]

Consistency of Federal Action

Federal agencies are directed to review their programs for consistency with the goal of conserving biological diversity.

In evaluating the impact of its programs on biological diversity, an agency should consider practices and regulations that affect *ex situ* conservation of germplasm, seeds and other reservoirs of genetic resources. Evaluations should also include an appraisal of land, aquatic, or marine resource management practices that may contribute to the loss of biological diversity.[104]

Agencies should evaluate alternatives to ongoing activities which adversely impact the landscape through habitat fragmentation, degradation or simplification, or which disrupt ecosystems, communities and species that are rare or otherwise vulnerable.[105]

D. Council on Environmental Quality Coordination and Comprehensive Federal Strategy

A comprehensive approach to arrest the loss of biological diversity requires a "national conservation strategy." [106] Such a Federal

---

[102] Beginning in the late 1970's, the Congress expressed its concern over international environmental issues by issuing a series of amendments to the Foreign Assistance Act of 1961 (P.L. 87-195). In 1983, Section 119 was added to the Act (P.L. 98-164) which directed the Agency for International Development (AID), in consultation with other Federal agencies to develop a U.S. strategy on conserving biological diversity in developing countries. AID, as the principal agency providing development assistance, was given a mandate to implement this policy, which reads in part: "In order to preserve biological diversity, the President is authorized to furnish assistance to countries in protecting and maintaining wildlife habitats and in developing sound wildlife management and plant conservation programs. Special efforts should be taken to establish and maintain wildlife sanctuaries, reserves, and parks; to enact and enforce anti-poaching measures; and to identify, study, and catalogue animal and plant species, especially in tropical environments." The "U.S. Strategy on the Conservation of Biological Diversity: An Interagency Task Force" was delivered to Congress in February, 1985. This report was followed by an annual report, "Progress in Conserving Biological Diversity in Developing Countries FY 1985," which outlines the implementation of Section 119. In 1986, Section 119 was amended to include funding specifically for biological diversity projects; See Abramovitz, J.N. 1991. P. 21. "Investing in Biological Diversity: U.S. Research and Conservation Efforts in Developing Countries." World Resources Institute, Washington, D.C.

[103] 1991 Hearing, supra note 1, at 41 (testimony of Peter Raven, Director, Missouri Botanical Garden). See also The United Nations Conference on Environment and Development: Hearings Before the Subcommittee on Environment of the House Committee and Science, Space and Technology, 102nd Cong. 1st Sess. (May 7, 1991) (No. 43).

[104] 1987 Hearings, supra note 2, at 53-71 (testimonies of Garrison Wilkes, University of Massachusetts; and Warren Thomas, Director, Los Angeles Zoo at 122-133); 1988 Hearings, supra note 20, at 326-327 (testimony of Henry Shands, Agriculture Research Service).

[105] 1987 Hearings, supra note 2, at 314-317 (testimony of the Wilderness Society). See also Council on Environmental Quality, 1980. Pp. 31-80. "Environmental Quality—1980." Washington, D.C.

[106] OTA Report, supra note 2, at 12.

Strategy would identify areas of common concern among the agencies resulting in a more efficient allocation of Federal resources and improved cooperation among Federal, State, and private programs in achieving their respective goals.

The agencies directing the management of Federal lands and waters would ensure the conservation of biological diversity by adopting a coordinated scientific approach to natural resource management that focuses on ecoregional considerations for protection of species diversity.[107] Maintenance of biological diversity on an ecoregional scale takes into account both abundance and distribution of species.

A coordinated Federal Strategy will increase the ability of the U.S. government to prevent future losses of biological diversity through a comprehensive network for conservation. Such a Federal Strategy should encompass four topics: science, protected areas, wise use of semi-natural areas, and recovery of endangered species.[108]

Section 5 of the bill directs the Council on Environmental Quality to prepare a Federal Strategy for the conservation of biological diversity. The Council on Environmental Quality shall prepare the Federal Strategy in consultation with the appropriate Federal Agencies. The Federal Strategy set forth in this bill is not intended to substitute for the development of formal interagency cooperative agreements necessary to achieve conservation goals.

H.R. 585 requires that the Federal Strategy contain certain elements, including identifying means of maintaining viable populations of native plants and animals; identifying means of maintaining representative examples of all types of natural communities native to the United States; identifying the specific roles of various Federal agencies in meeting the goals of the Federal Strategy; and establishing guidelines to help Federal agencies make their policies, actions and programs consistent with the Federal Strategy.

The Council on Environmental Quality, and the Federal Strategy it creates, shall provide a framework around which each agency can organize its own activities in a cooperative and comprehensive manner. However, responsibility for the implementation of this plan will reside with each agency to the extent practicable within its specific legal mandate.

Timetable

Within three months after the enactment of this Act, the Council on Environmental Quality shall identify Federal agencies that have a significant impact on biological diversity.

The Federal Strategy should be completed and submitted to Congress within one year after the date of enactment of this Act. Eighteen months after this Act is enacted, and every two years thereafter, each agency identified by the Council on Environmental Quality shall submit a report to the Council on Environmental Quality on the Agency's progress towards implementing the Federal Strategy. Six months after receipt of each agency's biennial

---

[107] Keystone Dialogue, supra note 65, at 13-16.

[108] Blockstein, D.E. Pp. 252-256. Toward a Federal Plan for Biological Diversity. In "Issues in Science and Technology," Vol. V(4), Washington, D.C.

report, the Council on Environmental Quality shall review each report and report to Congress on the consistency of Federal programs with the Federal Strategy.

Public Participation

H.R. 585 mandates that the public shall have the opportunity to participate in the preparation of, and to comment on, the Federal Strategy. Publication of notices in the Federal Register and open hearings will facilitate the participation of interested individuals.[109]

E. National Center for Biological Diversity and Conservation Research

H.R. 585 establishes a National Biological Diversity Center as a multi-agency controlled, semi-autonomous entity within the Smithsonian Institution.[110] It is the intent of this legislation that the Center be a cooperative effort involving Federal and State agencies and private sector groups. Under the Smithsonian's auspices, it is intended that the project will undertake a "general-purpose effort that will serve the needs of the scientific and management organizations throughout the nation and that has the ability to provide appropriate information to the Council on Environmental Quality, the Environmental Protection Agency, the Fish and Wildlife Service, the Forest Service, and other concerned agencies, as well as private institutions, such as the Nature Conservancy, concerned with the same problems." [111]

Section 7 of the bill establishes the National Center for Biological Diversity and Conservation Research for the purpose of summarizing and enhancing knowledge concerning the distribution, status, and characteristics of biological resources. The Center will collect data, coordinate existing databases, identify gaps in the knowledge base, provide information to the Council on Environmental Quality in its preparation of the Federal Strategy, and translate this information into a form useful to resource managers and policy makers.

The Office of Technology Assessment identified the existence of a critical gap in the area of information on biological resources.[112] This observation is confounded by the fact that while much important information regarding biological resources is not being compiled, many data collections exist which are virtually unused or inaccessible for a variety of reasons. It is impossible for land managers to make decisions regarding conservation of habitats and populations when fundamental information about their relative abundance and distribution is unavailable.

---

[109] 43 U.S.C. 1701 et. seq.; The success of the National Forest Management Act of 1976 illustrates the importance of States and local municipalities, landholders, conservation groups, and industry as active participants in the development of ecoregional strategies. These groups must be involved in cooperation efforts to implement conservation on a regional scale.

[110] 1991 Hearing, supra note 1, at 30 (testimony of Robert Adams, Secretary, Smithsonian Institution). The Smithsonian Institution has been involved in activities to study, document, and preserve the earth's biological diversity for more than 130 years.

[111] 1991 Hearing, supra note 1, at 40 (testimony of Peter Raven, Director, Missouri Botanical Garden).

[112] OTA Report, supra note 2, at 19.

Specifically, the Center will collect information on biological resources in a format that will facilitate the identification of those species and habitats which warrant monitoring, but are not yet subject to the statutory protection afforded threatened or endangered species. This information will be compiled by the Center in association with State agencies (such as State biological surveys and State Natural Heritage Programs), Federal agencies (such as the Environmental Protection Agency, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service), and recognized private groups (such as The Nature Conservancy and universities). Such information will provide advance warning of an action's potential effect on biological resources and thus serve as an early warning system to minimize the losses of rare and unique biological populations and communities as a result of the unintended consequences of human activities. An intended result of the effort will be cost savings to the Federal and State governments through reducing the efforts necessary for the recovery of species once they become endangered.

It is intended that the Center, in its capacity as a clearinghouse, will establish a network of databases to promote access to biological information rather than create its own massive biological database.[113] An evaluation and survey of the various databases and grants and support services for existing databases will aid in developing priorities for conservation action, monitoring trends, developing an alert system for notifying Federal land managers of adverse trends, and identifying gaps in scientific knowledge.

The network of databases established by the Center shall be compatible with the Natural Heritage System (developed by The Nature Conservancy) and the U.S. Fish and Wildlife Information System. The Center is authorized to "develop a plan for filling those gaps in our understanding of biological diversity, and provide funds to projects designed to contribute toward implementation of that plan." This plan will provide the framework for coordinating national efforts to manage biological resources.

While knowledge of the location, status, and condition of the parts of biological diversity is essential, management decisions will not wait for a precise accounting of the nation's biological resources. Initial broad-brush measures towards biogeographic accounting of the distribution and protection of biological diversity are an appropriate beginning.

Technological developments (such as Geographic Information Systems) can be used to develop large-scale vegetation maps and maps of other elements of biological diversity that would be useful in directing protection efforts towards specific areas. This has been done with considerable success in Hawaii and other Western States to identify areas of high biological diversity not included in the current networks of preserves. Such an "integrated systems" approach can be a cost-effective and efficient way to maintain maximum biological diversity in a minimum area." [114]

---

[113] Hearings supra note 20, at 322-323 (testimony of Donald Falk and Kerry Walter, University of California, Davis).

[114] 1988 Hearings, supra note 20, at 300-302 (testimony of Michael Scott, University of Idaho).

Section 7(c) establishes a Board of Trustees for the Center which shall establish the direction of, and the priorities for, research to be carried out by the Center. The board will consist of representatives of the Fish and Wildlife Service; the National Oceanic and Atmospheric Administration; the National Science Foundation; the Environmental Protection Agency; the Forest Service; the National Park Service; the Agriculture Research Service; the Bureau of Land Management; a program that maintains an inventory of biological diversity; a person or organization with experience in dealing with data on the status, distribution and trends of species and natural communities; two nonprofit research institutions or universities; and two institutions with collections of biological specimens. The State and private members are to be chosen by the President from a list compiled by the National Academy of Sciences. Because of their particular expertise in matters relevant to the Center, State biological surveys and/or Natural Heritage Programs should be represented on the board.

The National Center will award grants and contracts or use other appropriate mechanisms to fund its research activities. Making information available to decision makers and the public-at-large in an unbiased environment provided by the Smithsonian Institution, the Center will function as a public education organization. According to former Attorney General Elliot Richardson:

> It may be that the Center . . . is the single most practical step that could be taken which could then in turn help to create broader public understanding as well as develop the data.[115]

Educational efforts of the Center should be supported, in accordance with the Center's mission to summarize and enhance information regarding biological diversity.

The success of the Federal Strategy will be compromised without trained personnel and effective monitoring. Therefore, agencies should assess present efforts and give high priority to personnel training in basic ecology and conservation biology. Agencies should also assess their research and monitoring programs in light of the Federal Biological Diversity Strategy. Long-term research and monitoring will permit agencies to assess the effectiveness of their efforts on behalf of biological diversity conservation.

V. SECTION-BY-SECTION ANALYSIS

Sec. 1. Short Title

This bill is entitled the "National Biological Diversity Conservation and Environmental Research Act."

Sec. 2. Findings

States that the Earth's biological diversity is rapidly being reduced, with serious consequences for human welfare as resources are irretrievably lost and ecosystem functioning is possible endangered. Existing laws, which are largely uncoordinated and inad-

---

[115] 1988 Hearings, supra note 20, at 215 (testimony of Elliot Richardson, Roger Tory Peterson Institute).

equate, address the protection of individual endangered species rather than the maintenance of ecosystem conditions necessary for sustaining diversity. A comprehensive Federal Strategy is needed to arrest the loss of biological divesity. Increased ecological and biological research is needed to provide the knowledge to maintain biological diversity.

Sec. 3. Definitions

Contains definitions of terms used in the bill.

Sec. 4. Policy and Purposes

The purposes of this Act are to conserve biological diversity; to identify methods for achieving the goal of conserving biological diversity; to undertake a nationally coordinated effort to collect, synthesize, and disseminate adequate information for understanding biological diversity; to require assessment of the impact of major Federal actions on biological diversity in Environmental Impact Statements pursuant to the National Environmental Policy Act of 1969.

Sec. 5. Federal Biological Diversity Strategy

The Council on Environmental Quality is directed to develop a coordinated strategy for conservation of biological diversity. This Section describes specific points which should be addressed in the strategy. The public will be given the opportunity to comment on the strategy as it is developed. The completed strategy shall be submitted to the Congress within one year.

Sec. 6. Environmental Review

The Council on Environmental Quality is directed to develop guidelines for consideration of biological diversity in Environmental Impact Statements filed under the National Environmental Policy Act of 1969 and to identify biotic communities, species, and populations in decline, in imminent danger, or of other special concern. The Council on Environmental Quality shall identify Agencies that conduct programs with a significant impact on biological diversity. These agencies are required to review their programs biennially for consistency with the conservation of biological diversity.

Sec. 7. National Center for Biological Diversity and Conservation Research

Establishes within the Smithsonian Institution a National Center for Biological Diversity and Conservation Research to set research priorities and provide leadership and coordination for the understanding and promotion of knowledge of the biota, including the effects on the biota of human activities, and to make this knowledge accessible to the people of the United States. The Center's functions include preparing lists of biotic communities, species, and populations that appear to be in significant decline or in imminent danger of loss of viability, or are otherwise of special concern, as well as lists of areas of outstanding ecological or biotic importance; providing this information to the Council on Environmental Quality; providing information useful for the preparation and imple-

mentation of the Federal Strategy; publishing information relevant to understanding and conserving biological diversity; developing a strategic plan for and initiating and providing financial support towards an ongoing survey of the biota. A Board of Trustees, consisting of representatives of Federal land-managing and research agencies and the private sector appointed by the President, shall assist in setting the policies for and directing the work of the Center.

Sec. 8. Species and Natural Communities of Special Concern

Requires the Director of the U.S. Fish and Wildlife Service to identify species and natural communities of special concern and to notify Federal agencies of these species and communities of special concern for assessments prepared pursuant to the National Environmental Policy Act of 1969.

Sec. 9. Biological Diversity Inventory Grant.

Establishes a program of grants to persons and organizations involved in conducting inventories of biological diversity. Limits the Federal share of these grants to 75% of the cost of the activity.

Sec. 10. Conservation of Unprotected Natural Communities

Directs the Secretary of the Interior to identify native natural communities that are insufficiently protected. Directs the Secretary to notify Federal agencies with authority over lands that have insufficiently protected native natural communities and to advise them on management actions necessary to ensure the communities's survival; sets minimum requirements for what shall be considered protected lands.

Sec. 11. Authorization of Appropriations

Authorizes $3,000,000 per year for 1992, 1993 and 1994 for carrying out section 9; Authorizes $10,000,000 per year for 1992, 1993 and 1994 for carrying out the activities of the Center outlined in Section 7. States that the funds authorized under this section shall be from sums already authorized to be appropriated.

VI. OVERSIGHT FINDINGS AND RECOMMENDATIONS

Pursuant to rule XI, Clause 2(l)(3) of the Rules of the House of Representatives, and under Authority of Rule X, Clause 2(b)(1), and Clause 3(f), the result and findings of the oversight activities considered by the Committee on Science, Space, and Technology have been adopted and are incorporated in the recommendations found in the present bill and report.

VII. CONGRESSIONAL BUDGET ACT INFORMATION

This bill provides for new authorization rather that new budget authority, and consequently the provisions of Section 308(a) of the Congressional Budget Act of 1974 are not applicable.

VIII. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

In compliance with Section 403 of the Congressional Budget Act of 1974 and Rule XI, Clause 2(l)(3) of the Rules of the House of Representatives, the report of the Congressional Budget Office follows:

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, August 12, 1991.

Hon. GEORGE E. BROWN, Jr.,
Chairman, Committee on Science, Space, and Technology,
House of Representatives, Washinton, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the attached revised cost estimate for H.R. 585, the National Biological Diversity Conservation and Environmental Research Act.

This estimate supersedes the previous one dated August 1, 1991, and reflects all the amendments approved by the committee. Enactment of H.R. 585 would not affect direct spending or receipts. Therefore, pay-as-you-go procedures would not apply to the bill.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

JAMES L. BLUM
(For Robert D. Reischauer, Director).

cc: Honorable Robert S. Walker, Ranking Minority Member.

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE, AUG. 12, 1991

1. Bill number: H.R. 585.

2. Bill title: National Biological Diversity Conservation and Environmental Research Act.

3. Bill status: As ordered reported by the House Committee on Science, Space, and Technology on July 30, 1991.

4. Bill purpose: H.R. 585 would establish a set of requirements that would increase the role of the federal government in protecting biological diversity. Primarily, the requirements mandate the following actions by federal agencies.

The Smithsonian Institution would create a new National Center for Biological Diversity and Conservation Research to study priorities and provide information to the public. The bill would authorize the appropriation of $10 million for the center for each of the fiscal years 1992 through 1994.

The Secretary of the Interior would establish a program of grants for those conducting inventories by biological diversity. The bill would authorize the appropriation of $3 million for the grants for each of the years 1992 through 1994.

The Council on Environmental Quality (CEQ) would prepare a coordinated federal strategy for the conservation of biological diversity and submit it to the Congress within one year from the date of enactment.

The CEQ would issue guidance to assist agencies in assessing the impact of their actions on biological diversity when preparing environmental impact statements. Federal agencies would review their programs and report every two years to the Congress and the CEQ on their consistency with the conservation of biological diversity.

5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1992	1993	1994	1995	1996
Authorization level	13	13	13	.....	.....
Estimated outlays	12	13	13	1	.....

The costs of this bill fall within budget functions 300 and 500.

Basis of estimate: For the amounts specifically authorized for the years 1992–1994, H.R. 585 states that such amounts "shall be derived from sums otherwise authorized to be appropriated," but does not provide and specific source of existing authorizations. This estimate therefore displays the full amounts authorized in this bill. CBO expects that enactment of the bill would not result in significant additional costs to the CEQ or to other federal agencies.

6. Pay-as-you-go considerations: The Budget Enforcement Act of 1990 sets up pay-as-you-go procedures for legislation affecting direct spending or receipts through 1995. CBO estimates that enactment of H.R. 585 would not affect direct spending or receipts. Therefore, pay-as-you-go procedures would not apply to the bill.

7. Estimated cost to State and local governments: None.

8. Estimate comparison: None.

9. Previous CBO estimate: This estimate supersedes a previous one dated August 1, 1991, which was based on the introduced version of H.R. 585. This estimate reflects amendments to H.R. 585 approved by the committee.

10. Estimate prepared by: James Hearn.

11. Estimate approved by: C.G. Nuckols, for James L. Blum, Assistant Director for Budget Analysis.

IX. EFFECT ON LEGISLATION ON INFLATION

In Accordance with Clause 2(l)(4) of Rule XI of the Rules of the House of Representatives, this legislation is assessed to have no inflationary effect on prices and costs in the operation of the national economy.

X. CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

This bill makes no changes in existing law pursuant to Clause 3, of Rule XIII of the Rules of the House of Representatives.

XI. COMMITTEE RECOMMENDATION

A quorum being present, the Committee favorably reported the bill, H.R. 585 as amended by voice vote, and recommends its enactment.

XII. ADDITIONAL AND DISSENTING VIEWS

ADDITIONAL VIEWS SUBMITTED BY CONGRESSMAN DON RITTER AND CONGRESSWOMAN CONSTANCE MORELLA

Private conservation organizations, such as the Rails-to-Trails Conservancy, are using new land management techniques to attempt to rectify the problems associated with habitat fragmentation. The concept of saving open spaces for environmental protection, as well as for recreation, dates to the turn of the 20th Century. However, the idea of linking these open spaces is new, and the idea that these linked open spaces play an important part in conserving biological diversity is also of recent origin.

In many parts of the country, "greenways," linear open spaces along natural corridors, such as riverfronts, canals, stream valleys, ridgelines, or along other corridors, such as converted railroad rights-of-way, are being set up to connect fragmented portions of natural habitats. In 1987 for example, The Conservation Fund, a national non-profit land and water conservation organization, designed a comprehensive program to advance the greenways concept, and created the "American Greenways Program." [1]

The State of Maryland is the leader in the greenways movement. The program is financed by a real estate transfer tax that provides a grants-in-aid method of encouraging local governments and nonprofit groups to initiate greenway projects under the state comprehensive plan. Federal land management agencies have great potential for developing greenway corridor systems for biodiversity by linking fragmented habitats on their lands, between agency lands, and with adjoining public and private open spaces, where appropriate.

Programs such as this have had some success in habitat protection. In the Washington, D.C. metropolitan area, for example, white-tailed deer, beaver, raccoons, foxes and other animals travel between Rock Creek Park and West Virginia via a greenway traversing the C&O Canal and the Potomac River. Through the urbanized areas of Bethlehem, Allentown, and Easton, Pennsylvania runs a greenway protection for recreation and wildlife as part of the Delaware and Lehigh Navigational Canal National Heritage Corridor.

The Bureau of Land Management should initiate a pilot linkage analysis program to examine possible connections between its extensive fragmented lands and other federal, state, and local open space habitats. Other federal agencies, among them, NOAA's Coastal Zone Management program, the U.S. Fish and Wildlife Service, the EPA's mapping program for threatened wetland habi-

[1] Kay, Keith G. 1990. Pp. 1-25. "The Role of Greenways in Conserving Biological Diversity," American Greenways, The Conservation Fund, Arlington, Virginia.

tat, have the potential to encourage development of a national greenway strategy.

Greenways offer opportunities to preserve migratory corridors and habitat for a diversity of plants and animals. They are therefore worthy attempts to consider management of natural environments on a scale large enough to alleviate problems of habitat fragmentation. They are, however, only a first attempt to solve an enormous problem.

DON RITTER.
CONSTANCE MORELLA.

Dissenting Views on H.R. 585, National Biological Diversity Conservation and Environmental Research Act

The Committee on Science, Space, and Technology seeks, through the National Biological Diversity Conservation and Environmental Research Act, to institute a pervasive federal program to conserve "biological diversity" before it is known what specifically constitutes biological diversity; what impacts human activities have on biological diversity; and what cost-effective methods can be employed to conserve biological diversity. The Committee report itself states, "Efforts to conserve biological diversity are severely hampered by a lack of fundamental knowledge." The bill is premature in that it establishes a comprehensive program for the conservation of biological diversity with no informational base from which to develop meaningful and cost-effective approaches to preserving habitats at risk.

Instead of using a bottom-up approach to preserving biological diversity, the Committee utilizes a top-down structure which creates a full-fledged, bureaucratic jungle before there is any form of consensus on how to most effectively implement this program. The bill requires the Council on Environmental Quality to prepare a coordinated federal strategy for the conservation of biological diversity. Federal agencies with programs that significantly impact biological diversity are required to, within eighteen months after the date of enactment and every 2 years thereafter, review its actions in conjunction with the Council's strategy and report the results to the Council. Federal agencies are also required to assess biological diversity in environmental impact statements.

The Committee's approach is to add to the already multi-layered bureaucracy of the Federal government in regard to the environment without regard to the conflicts which could develop in the overlapping jurisdiction of Federal agencies. The Committee has made only limited reference to addressing conflicts of jurisdiction and has completely disregarded the affects of economic impacts to local communities which frequently arise when there is no mechanism for balancing divergent interests.

A more appropriate approach to conservation of biological diversity should be based on incremental steps beginning with compilation of a comprehensive species and habitat inventory. This inventory compilation could be effectively carried out by the Biological Diversity Center within the Smithsonian Institution as set out by section 7 of the bill. Creation of this center should be the first step in gathering the information that is needed to make informed decisions about how to preserve biological diversity. The bill itself states in section 2(8) "existing information regarding the abundance and distribution of biological diversity is inadequate, often inaccessible, and frequently inapplicable to conservation manage-

ment, thus hampering the efficiency of resource policy and management decisions."

The bill further mandates that natural communities that do not occur in at least 3 protected areas must be managed so as to maintain viable populations of native plants and animals. Therefore, a protected area would require that a specific area of land, including terrestrial or aquatic, be dedicated solely to the purpose of preserving biological communities. A more reasonable approach to managing land areas would consider several factors beyond just biological diversity such as recreation, aesthetics, tourism, and existing commercial activities. The federal strategy to conserve biological communities should also take into account the strategy's impact on people, their livelihood and their standard of living.

RON PACKARD.
ROBERT S. WALKER.
F. JAMES SENSENBRENNER, Jr.
SID MORRISON.
D. FRENCH SLAUGHTER, Jr.
DANA ROHRABACHER.
STEVE SCHIFF.
JOHN J. RHODES.
JOE BARTON.

○